Mr. Rothberg

WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION
AND AGRICULTURAL WATER MANAGEMENT

LOWER BAYOU TECHE WATERSHED

IBERIA, VERMILION, LAFAYETTE,
AND ST MARY PARISHES, LOUISIANA

APRIL 1965

4-19972 5-65

4-19972 4-65

WATERSHED WORK PLAN AGREEMENT

between the

IBERIA-VERMILION SOIL AND WATER CONSERVATION DISTRICT
Local Organization

ST. MARY SOIL AND WATER CONSERVATION DISTRICT
Local Organization

GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT
Local Organization

IBERIA PARISH POLICE JURY
Local Organization

State of Louisiana
(hereinafter referred to as the Sponsoring Local Organizations)

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organizations for assistance in preparing a plan for works of improvement for the Lower Bayou Teche Watershed, State of Louisiana, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666), as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organizations and the Service a mutually satisfactory plan for works of improvement for the Lower Bayou Teche Watershed, State of Louisiana, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organizations and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about seven years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Iberia Parish Police Jury will acquire without cost to the Federal Government such land, easements, or rights-of-way as will be needed in connection with the works of improvement. (Estimated cost $401,700.)

2. The Sponsoring Local Organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

3. The percentages of construction costs of structural measures to be paid by the Iberia Parish Police Jury and by the Service are as follows:

a.

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
Water Control Structures	50	50	204,380

b. The Iberia Parish Police Jury will construct by force account an agreed portion of the multi-purpose mains and laterals system aggregating approximately 25 percent of such total system and estimated to cost $212,220 as its total contribution toward this phase of the work. The Service will provide all of the funds required to finance the construction under contract of the remainder of the multi-purpose lateral system, such contribution to aggregate approximately 75 percent of such total system and being estimated to cost $636,660. The total cost of construction of this phase of the work is estimated to be $848,880.

4. The percentages of the cost for installation services to be borne by the Sponsoring Local Organizations and the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Installation Service Cost (dollars)
All	0	100	344,608

5. The Iberia Parish Police Jury will bear the costs of administering contracts. (Estimated cost $21,500.)

6. The Sponsoring Local Organizations will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.

7. The Sponsoring Local Organizations will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

8. The Iberia Parish Police Jury will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

9. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

10. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

    Where there is a Federal contribution to the construction cost of works of improvement, a separate agreement in connection with each construction contract will be entered into between the Service and the Iberia Parish Police Jury prior to the issuance of the invitation to bid. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

11. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

12. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

13. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. Sec. 15.1-15.13), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

Iberia-Vermilion Soil & Water Conservation District
Local Organization

By Nedier J. LeBlanc, Sr.
Nedier J. LeBlanc, Sr.
Title Chairman

Date May 18, 1965

The signing of this agreement was authorized by a resolution of the governing body of the Iberia-Vermilion Soil & Water Conservation District
Local Organization
adopted at a meeting held on _____

J. F. Noel
Secretary, Iberia-Vermilion Soil & Water Conservation District
J. F. Noel, Sr.
Date May 18, 1965

St. Mary Soil & Water Conservation District
Local Organization

By Clay Terry
Clay Terry
Title Chairman, Board of Supervisors

Date May 12, 1965

The signing of this agreement was authorized by a resolution of the governing body of the St. Mary Soil & Water Conservation District
Local Organization
adopted at a meeting held on 11 May 65

Clegg Caffery
Secretary, St. Mary Soil & Water Conservation District
Clegg Caffery

Date 12 May 65

Grand Coteau Ridge Soil & Water Conservation District
Local Organization

By Earl Fontenot Sr.
Earl Fontenot, Sr.

Title Chairman

Date May 17, 1965

The signing of this agreement was authorized by a resolution of the governing body of the Grand Coteau Ridge Soil & Water Conservation District
Local Organization
adopted at a meeting held on May 17, 1965

Aubrey G. LaHaye
Secretary, Grand Coteau Ridge Soil & Water Conservation District Aubrey G. LaHaye

Date May 12, 1965

Iberia Parish Police Jury
Local Organization

By Roy LaBaure
Roy LaBaure

Title President

Date May 26, 1965

The signing of this agreement was authorized by a resolution of the governing body of the Iberia Parish Police Jury adopted at a meeting
Local Organization
held on May 26, 1965

Marcus DeBlanc
Secretary, Iberia Parish Police Jury
Marcus DeBlanc

Date May 26, 1965

Soil Conservation Service
United States Department of Agriculture

By _____

Date _____

WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION AND AGRICULTURAL WATER MANAGEMENT

LOWER BAYOU TECHE WATERSHED

Iberia, Vermilion, Lafayette, and St. Mary Parishes, Louisiana

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act, (Public Law 566, 83rd Congress, 68 Stat. 666), as amended.

Prepared By:

Iberia Parish Police Jury
(Sponsor)

Iberia-Vermilion, Grand Coteau Ridge, and St. Mary Soil and Water Conservation Districts
(Sponsors)

With Assistance By:

United States Department of Agriculture
Soil Conservation Service
April 1965

4-19972 4-65
USDA-SCS-FORT WORTH, TEX. 1965

WATERSHED WORK PLAN

LOWER BAYOU TECHE WATERSHED
Iberia, Vermilion, Lafayette, and St. Mary Parishes, Louisiana
April 1965

SUMMARY OF PLAN

Description of Watershed

This work plan for watershed protection, flood prevention, and agricultural water management in the Lower Bayou Teche Watershed was prepared by the Iberia Parish Police Jury and the Iberia-Vermilion, Grand Coteau Ridge, and St. Mary Soil and Water Conservation Districts as sponsoring local organizations. Technical assistance was provided by the Soil Conservation Service of the United States Department of Agriculture.

The watershed contains 188,700 acres, or 295 square miles, in Iberia, Vermilion, Lafayette, and St. Mary Parishes. Approximately 43 percent of the watershed is in cropland; 12 percent in grassland; 34 percent in marshland; 5 percent in woodland; and 6 percent in miscellaneous uses such as roads, railroads, ditches and canals, oil and gas production and transmission facilities, farmsteads, idle areas, etc. All land is privately owned except about 4,400 acres of Federal land, which is administered by the United States Navy, and about 620 acres of State land, which is administered by Louisiana State University.

The primary objectives of the project are watershed protection, flood prevention, and agricultural water management. The proposed plan will meet these objectives. The work plan proposes installing, in a 4-year period for structural measures and a 7-year period for land treatment measures, a project for protection and development of the watershed at a total installation cost of $2,773,536. Public Law 566 will bear $1,188,363, or 43 percent of this total; and the remaining $1,585,173, or 57 percent, will be borne by other funds. Local interests will bear the entire cost of operation and maintenance.

Land Treatment Measures

Approximately 40 percent of all needed land treatment measures for watershed protection and improvement will be installed within the 7-year installation period. The cost of these measures is estimated to be $952,468, of which $785,281 is for the cost of installing the practices and includes expected reimbursement from the Agricultural Stabilization and Conservation Service. The remaining $167,187 is for technical assistance and includes $62,282 presently being provided by the going programs and $104,905 needed to accelerate the installation of the needed measures within the 7-year project installation period.

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Land treatment needed for watershed protection, flood prevention, and agricultural water management, which is expected to be installed during the project period, is shown in table 1.

Structural Measures

Structural measures to be installed include 3 water control structures and improvement of approximately 132 miles of multiple-purpose channels. The total cost of structural measures is estimated to be $1,821,068, of which Public Law 566 will bear $1,083,458. The remaining $737,610 will be borne by other funds, which includes $314,410 for construction; $401,700 for land, easements, and rights-of-way, including value of land, legal fees, and modification of facilities; and $21,500 for contract administration.

Benefits

The project will directly benefit 750 farm units in the area. The average annual benefits accruing to structural measures is estimated to be $209,457. The average annual cost of these measures is estimated to be $121,070, which produces a ratio of benefits to cost of 1.7 to 1.

Operation and Maintenance

Land treatment measures will be maintained by the landowners and operators of the farms on which the measures are installed. The Iberia-Vermilion, Grand Coteau Ridge, and St. Mary Soil and Water Conservation Districts will furnish technical assistance.

Structural measures will be operated and maintained by the Iberia Parish Police Jury. The police jury is presently collecting a 4-mill tax in the watershed. This is considered adequate to cover the operation and maintenance of the structural measures. Estimated annual operation and maintenance costs are $48,610, based on long-term prices.

Provisions for Financing Project Installation

The police jury now owns and operates 4 draglines and 3 bulldozers for the purpose of maintaining channels in adequate condition for proper removal of runoff and for improving existing channels which are not adequate. All channels which are improved or maintained by the parish equipment provide benefits to more than one individual farm. A 4-mill tax is presently being collected for the purpose of providing operating funds for this equipment, including its maintenance and necessary salaries for operating and supervisory personnel.

The sponsors will improve a portion of the channels included in the plan, which will represent a portion of their contribution to the construction cost.

The 4-mill tax presently being collected is considered adequate to operate and maintain the equipment and to provide the additional local share of the cost of project installation.

A project agreement will be entered into between the Iberia Parish Police Jury and the Soil Conservation Service to include the commitments by both parties.

DESCRIPTION OF THE WATERSHED

Physical Data

Lower Bayou Teche Watershed is located on the right descending bank of Bayou Teche in the parishes of Iberia, St. Mary, Lafayette, and Vermilion and comprises 188,700 acres. The cities of New Iberia and Jeanerette are partially within the watershed and are the only two urban areas in the watershed. New Iberia is in the eastern portion of the watershed and Jeanerette is in the southeastern portion.

The drainage pattern of the watershed is generally from north to south. The principal water courses are the Iberia-St. Mary Canal, Weeks Bayou, Bayou Carlin, and Bayou Petite Anse. Most of these have been enlarged over a period of years. The topography is so flat that a true floodplain cannot be identified, and many miles of on-farm ditches are required to deliver rainfall runoff to the main channels.

The predominant slope of the land is less than one foot per mile. The elevations range from near sea level in the marsh areas at the southern edge to 30 feet above sea level in the northern part of the watershed. Three salt domes in the southern marshes rise to an elevation of over 100 feet.

The northern two-thirds of the watershed lies in the Southern Mississippi Valley Silty Uplands land resource area, and the southern one-third lies in the Gulf Coast Marshlands. These land resource areas locale correspond to the Prairie formation in the north and the Deltaic Plain deposits in the south. The Deltaic Plain deposits are Recent Alluvium and the Prairie is a Pleistocene Terrace Deposit. Both formations belong to the Quaternary System of the Cenozoic Era.

Salt domes at Weeks Island, Avery Island, Jefferson Island, New Iberia, and Jeanerette provide the structural traps needed for petroleum production. The near surface domes at Weeks Island, Avery Island, and Jefferson Island also provide commercial salt mines.

The dominant soil series of the northern portion of the watershed are the Jeanerette, Olivier, Iberia, and Baldwin. Approximately 90 percent of the agricultural land is in these series, which are characterized as "black silty loam and silty clay, loam soils, neutral to alkaline and slowly permeable." The soils of the Gulf Coast Marsh Land Resource Area are equally divided between fresh and moderately saline marsh.

The United States Navy administers approximately 4,400 acres of Federal land comprising the United States Naval Auxiliary Air Station at New Iberia; and the Louisiana State University administers about 620 acres of State land in the Iberia Experimental Livestock Farm, which is within the watershed. The remaining 183,680 acres is privately owned. The general

hydrologic cover conditions on the land, cutside of the marsh, range from fair to good. The hydrologic cover conditions on the marshland are about 10 percent poor, 30 percent fair to good, and 60 percent good to excellent.

The average annual rainfall of about 58 inches is usually well distributed throughout the year; however, heavy rainfall causing serious crop and pasture damage may occur at any season. Normally, the two driest months are March and November with an average rainfall of 3.5 and 3.7 inches respectively. The two wettest months are June and July with 5.3 and 7.3 inches.

The mean monthly temperatures range from 54 degrees Fahrenheit in January to 82 degrees in July. The maximum recorded temperature is 105 degrees and the minimum is 5 degrees. The average frost-free period of 264 days extends from March 2 to November 20.

Water for domestic use is obtained mainly from deep wells. Livestock water is obtained from shallow wells and from open channels.

Industrial and municipal water is presently adequate.

The value of fish and wildlife resources in the watershed area is highly variable, ranging from low in the intensively developed agricultural portion to high in the swamps and marshes. Both sport and commercial fishing are important in the major waterways north of Vermilion Bay. This segment of the watershed also constitutes a part of the coastal nursery area for marine species and is, therefore, important to the Gulf fishery.

Waterfowl hunting and trapping for fur bearers in the marshlands comprise major wildlife-use activities in this area; rabbits, bobwhites, and doves constitute the wildlife resources in the northern portion of the watershed.

Economic Data

The economy of the watershed is based on farming, the processing of farm-produced products, and the production and processing of oil and salt.

Major farm crops in the watershed are sugar cane, rice, corn, and pasture for livestock production. Total agricultural production for Iberia Parish in 1959 was $6,800,000.

The present land use for the watershed is as follows:

Land Use	Acres	Percent
Cropland	80,500	43
Grassland	22,900	12
Marsh	63,875	34
Woodland	9,400	5
Miscellaneous 1/	12,025	6
Total	188,700	100

1/ Includes farmsteads, roads, railroads, waterways, urban areas, etc.

Corn and cotton were important crops in the watershed during the early 1950's; however, they are being replaced by sugar cane and improved pasture. Rice production has been about constant during the last 15 years. Trends in the watershed now are toward sugar cane and improved pasture. Importance of sugar cane products to the economy of the watershed is emphasized by the installation of a new sugar mill at New Iberia. This mill was installed at a cost of $9,000,000 and became operational in the fall of 1964. The mill employs an estimated 300 persons during the operating season. There are 4 additional sugar mills in the watershed with a total employment of 1,100 people during the operating season.

There are approximately 800 farms in the watershed. These farms average 210 acres in size and produce $8,400 annually from the sale of farm products. Present value of the land, buildings, and improvements is $226 per acre. The trend is toward owner-operated farms; however, there are still a few farms that are tennant operated.

There are several oil-, gas-, and salt-producing areas in the watershed. Three salt-processing plants and several plants for processing peppers are in the area and furnish employment for the people. There are no oil- or gas-processing plants, but the numerous pipelines and pumping plants offer employment.

There are about 180 miles of improved roads, of which 100 miles are hard surfaced. U. S. Highway 90 crosses the area and extends along the entire northeastern side.

The Southern Pacific and Missouri Pacific Railroads furnish rail transportation to practically the entire area. The Intracoastal Waterway affords opportunities for sea-going transportation, and certain canals and bayous offer barge access to the area.

There are an estimated 36,500 people in the watershed, of which 16,500 live in the rural areas. The population in the watershed is increasing at about the same level as that of the state; however, rural population is decreasing slightly.

The marsh and swampland is productive for both waterfowl hunting and commercial trapping for fur-bearing animals. Many landowners lease trapping rights to sportsmen.

Land Treatment Data

The 800 farms in the watershed are served by the Iberia-Vermilion, Grand Coteau Ridge, and St. Mary Soil and Water Conservation Districts. Assistance is furnished the watershed by the work units located at New Iberia, Lafayette, Franklin, and Abbeville. These work units have assisted in the preparation of 490 conservation plans on approximately 104,000 acres within the watershed. Of this number, 465 plans covering approximately 102,000 acres are basic conservation plans. This represents about 55 percent of the watershed.

Approximately 40 percent of the planned land treatment measures have been installed. A summary of the land treatment measures that have been installed in the watershed during the last 10 years is shown in table 1A. Cost of installing these measures is estimated to be $1,311,790.

The installation of these land treatment measures is an indication that the landowners recognize the need for sound soil and water conservation practices for the treatment of the land in accordance with its needs and for its protection and improvement for present and future production.

WATERSHED PROBLEMS

Floodwater Damage

The 58 inches of annual rainfall is usually well distributed throughout the year; however, floodwater damage from excessively heavy direct precipitation occurs almost every year and frequently several times each year.

A rainfall of at least 2.5 inches in a 24-hour period is expected to occur at least twice each year; 4.3 inches once each year; and 7.2 inches once each 5 years.

The topography of the watershed is such that some of the areas, due to the location or use, do not suffer floodwater damage from direct precipitation. Runoff from these areas does contribute to the flooding of other areas where damage occurs.

The present capacity of the existing ditches and channels in the watershed is such that out-of-bank flow occurs from the runoff of a rainfall that could be expected to occur twice a year. This out-of-bank flow causes landowners to invest in additional cultural practices in production and the use of additional equipment and labor in harvesting in order to obtain normal yields. Additional losses are incurred by the landowners due to the out-of-bank flow causing untimely harvesting. The quality of both rice and sugar cane is adversely affected when normal harvesting is delayed.

Problems Relating to Water Management

Approximately 60 percent of the existing ditches and channels in the watershed are of insufficient capacity to adequately remove rainfall runoff. Adequate outlets are available for any system which may be developed. Because of the flat topography, floodwater and other water management problems caused by the runoff of rainfall within the watershed are inseparable.

A portion of the marsh in the watershed is brackish and a portion is fresh. In recent years salt tidewater has begun to intrude into the freshwater marsh. Vegetation normally found in freshwater marsh areas is quickly killed when subjected to saline conditions produced by tidal inflow. About 8,800 acres of freshwater marsh has become unstable and is rapidly losing its vegetative cover. As this desirable freshwater vegetation dies out, it is replaced by a low-quality, semi-saltwater vegetation which thrives in either salt or fresh marsh. Desirable saltwater vegetation

does not thrive because the marsh contains alternately salt and fresh water, and neither type of desirable vegetation can be maintained. A reduction in the range and wildlife productivity of this area has been brought about by this intrusion of saltwater into the freshwater marsh.

Facilities for water-based recreation are inadequate. There are no suitable bodies of water near the watershed where water-based sports such as boating, skiing, or swimming can be enjoyed. City swimming pools and parks provide a few facilities for swimming and picnicking. Persons wishing to enjoy boating or skiing must drive 50 miles or more. A small amount of fishing is available in the bayous and channels, but is inadequate for the need. The project sponsors have recognized the need for additional recreational facilities and have requested that this plan provide such facilities.

Erosion Damage

Slope stability in some of the constructed channels has presented a problem. This problem has been prevalent only in those channels constructed across ancestrial channels where saturated, poorly sorted sands were encourtered. At present most of this erosion has stabilized itself.

Over-all erosion in the watershed is minor due to the installation of land treatment measures and the topography of the watershed.

Sediment Damage

There is very little sediment damage in the watershed. Regular channel maintenance by the Iberia Parish Police Jury and the landowners is sufficient to remove the small amount of sediment which accumulates.

PROJECTS OF OTHER AGENCIES

A portion of the Intracoastal Waterway, which extends from Florida to Brownsville, Texas, makes up most of the southern boundary of the watershed. This waterway was constructed by the U. S. Army Corps of Engineers. Hydrologic investigations show that the works of improvement included in this work plan will have no significant effects on the waterway.

Additional water for irrigation has been made available in Bayou Teche by the U. S. Army Corps of Engineers through the construction and operation of drainage structures in the west Atchafalaya Basin protection levee near Courtableau, the construction of control weirs on the south bank of Bayou Courtableau, the enlargement of the upper Bayou Teche, and the construction of a low-level dam in Bayou Fusilier. These improvements cause the low flow of Bayou Courtableau, supplemented by additional water from the Atchafalaya Basin Floodway when stages are favorable, to flow into Bayou Teche at Port Barre and the pool above Keystone Dam. They will not be affected by the works of improvement included in this work plan.

BASIS FOR PROJECT FORMULATION

The sponsors requested that consideration be given to all measures needed for adequate watershed protection, flood prevention, agricultural water management, and recreation. They were cognizant of the need for a level of protection commensurate with the other risks of agricultural production in the watershed. It is believed that measures necessary to meet these objectives will tend to counteract the downward trend in population in the

rural areas and in agricultural and nonagricultural employment. They feel their desire to improve the economic tone of the area can be met by the installation of measures necessary for meeting these objectives.

Determination was made, first, of the land treatment measures which contribute directly to watershed protection, flood prevention, and agricultural water management and which remain to be done in the watershed, based on land capability classes determined from soil surveys.

Although significant beneficial effects would result from installation of land treatment measures, it was apparent that structural measures would be required to attain the degree of protection desired. Based on completed field investigations and surveys, it was determined that improved channels would provide the most effective and economical means for removal of flood runoff and excess water from on-farm drainage systems. Water control structures installed in channels in the southern reaches of the marsh range would most effectively prevent further deterioration to the marsh.

The project, as formulated, will provide for the needed land treatment measures, an approximate two-year level of protection against flooding, drainage outlets for all farmland of more than 320 acres or 2 or more landowners, and protection to 8,800 acres of marsh range. In so doing, the sponsors wish to preserve fish and wildlife resources.

A careful study of the area did not reveal a suitable site for water-based recreation. There are no suitable lakes or streams presently existing, and there are no sites available where suitable facilities can be developed. The stream channels in the lower portion of the watershed, both existing and those to be improved, remain nearly filled with water at all times. This is due to the low elevation of the land. A small amount of boating and fishing is enjoyed in these channels, and these sports will continue following project installation. However, due to the general inaccessability of these channels, the low, soft, saturated condition of the ground adjacent to these channels, and the mosquito and snake infestations normally found in these areas during the spring and summer, it was decided that these channels could not provide a desirable setting for water-based recreation and minimum basic facilities necessary for their enjoyment.

Lake Peigneur, an existing lake in the southwestern portion of the watershed, was considered for recreational purposes. This lake has a large water surface area; however, it is too shallow to provide sufficient water depth for boating, water skiing, and swimming. A study revealed that this lake could not be developed to provide sufficient depth for these water sports. Biologists of the Soil Conservation Service and the Louisiana Wild Life and Fisheries Commission reported that this lake could not be developed, within reasonable cost, for fishing.

No provisions are included in this plan for recreation. The sponsors have been informed of this and are satisfied that this purpose for watershed development has been explored as far as possible and satisfactory provisions cannot be made for its inclusion in the work plan.

The project sponsors believe that, except for recreation, their objectives will be adequately accomplished through the installation of this project.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

An effective conservation program based upon the use of each acre of agricultural land within its capabilities and its treatment in accordance with its needs for present and future production, such as is now being carried out by the soil and water conservation districts serving the watershed, is necessary for a sound flood prevention and water management program. Basic to reaching this objective is the establishment and maintenance of all applicable soil and water conservation measures essential to proper land use. Emphasis will be placed on accelerating the establishment of land treatment practices which have a measurable effect on the reduction of floodwater, sediment and erosion damage, and agricultural water management problems.

The land treatment measures that have been applied within the watershed during the last decade represent an expenditure of approximately $1,311,790 by landowners and operators.

Table 1 includes estimates of the acreages in each major land use that will receive accelerated land treatment during the 7-year project installation period. These measures will be established and maintained by the landowners and operators in cooperation with the going district programs. In addition to the presently available technical assistance, Public Law 566 funds will be made available to accelerate the establishment of these practices and measures. This amount includes funds necessary to complete essential soil surveys. In this watershed the trend is to increase sugar cane and pasture in the land use pattern. About 18,000 acres of cultivated land will be treated with a combination of measures, including cover cropping in a conservation cropping system and improved use of crop residue for soil protection and conditioning.

Approximately 4,200 acres of pasture land will be renovated and re-seeded during the 7-year installation period. In addition to this renovation, approximately 12,000 acres of pasture land will be maintained through brush and weed control, proper use, and rotation grazing.

About 4,500 acres of marsh will be maintained through controlled burning and deferred grazing. In addition to this grazed area in the marsh, approximately 2,200 acres of marsh will have wildlife wetland preservation practices applied, and 1,000 acres of wildlife wetland will be developed. Landowners will install 55 structures for water control. Bedding, land smoothing, and land grading will be established on approximately 22,000 acres where crops are now being grown. Drainage systems totaling 5,500,000 feet for disposal of surplus water from these areas will be installed.

The installation of land treatment measures will reduce the total annual erosion by approximately 5 percent and will reduce the maintenance cost on

the farm laterals and the main outlets. Infiltration will be increased by the improvement of cover in the cultivated areas and increased grass density and vigor in the pastured areas. Land leveling and smoothing will orient the runoff from cultivated fields and allow for the utilization of maximum amounts of water without flooding during heavy or prolonged rainfall.

Since this watershed is of an agricultural nature, there are no forestry measures planned or recommended. If a need for forestry assistance develops, the Louisiana Forestry Commission will provide technical assistance to landowners under existing Cooperative Forestry Management Programs, in cooperation with the United States Forest Service.

By accelerating the present rate of technical assistance, it is expected that during the 7-year installation period the following accomplishments will be made.

1. A total of 177 landowners or operators will become district cooperators.

2. A total of 162 basic plans involving the entire farm will be developed.

3. A total of 69 basic farm plans now in use will be revised.

4. Land treatment measures listed above are expected to be installed.

5. Standard soil surveys will be made on 128,490 acres.

Structural Measures

There are presently about 207 miles of channels in the watershed, of which 75 miles are adequate in their present condition to provide the level of protection needed. Planned structural measures to be installed include the improvement of approximately 132 miles of multiple-purpose channels for flood prevention and agricultural water management and construction of 3 single-purpose water control structures for agricultural water management. About 99 miles of channel will be enlarged, and 33 miles will be cleared and snagged. New sections of channels will be constructed only for better alignment of existing channels or to more effectively utilize existing land use patterns and drainage systems.

The project map shows the numbering and location of 132 miles of principal channels, of which 113 miles will be improved by enlargement or clearing and snagging. The exact locations of the remaining 19 miles of small laterals will be determined in the design stage when additional data are available.

Channel improvement will serve both flood prevention and agricultural water management, will provide adequate outlets for on-farm drainage systems, and will have sufficient capacity to remove the runoff of about a two-year frequency storm. Spoil from the channels will be stacked in wooded areas

and spread to specifications in open areas. Where necessary for erosion control, a short recess for the purpose of sediment interception will be excavated at the junction of the lateral and main channel.

The cost of reinforcing, underpinning, or reconstruction of public road bridge piers or abutments, made necessary by deepening of channels, is part of the construction cost of channel improvement. About 35 bridges will need to be modified or reconstructed for this reason. Other bridges, culverts, gates, fences, pipeline crossings, or other existing structures which will need to be modified, will be considered land, easements, and rights-of-way cost.

Total cost of channel improvement is estimated to be $1,546,820.

Three water control structures for management of range marsh will be constructed. A boat gate will be installed in each of these, which can be readily opened and closed to permit passage of small boats. These structures will be provided with two gates for management of water flow into, and out of, the area. An inside gate, when in a closed position, will hold water in the marsh area for range and wildlife management purposes, but may be raised to allow free flow out of the area during periods of rainfall runoff or when it is not desirable to hold water in the channel to the elevation of the gate. An outside gate will automatically prevent tidewater from entering the area when it is functioning, but may be held in an open position to allow water to enter when desirable for beneficial purposes.

The inside gate will be constructed in such manner that, when closed, the top of the gate will be at elevation 1.0 feet m.s.l. and will hold water in the channel to this elevation. The Soil Conservation Service biologist, range conservationist, and the local sponsors have agreed that this is the elevation which will be most beneficial to the marsh, considering both range management and wildlife habitat. The top of the outside gate, when closed, will be at 4.7 feet m.s.l. This will prevent possible damage to the gate from overtopping during the passage of a tide event of less than 5-year probable recurrence interval. The operation and maintenance of these weirs will be in the operation and maintenance agreement. Details of this type of structure are shown in figure 1 and are located on the project map.

The estimated cost of installing these water control structures is $274,248. They will be single-purpose structures serving agricultural water management.

Structural measures for flood prevention and agricultural water management are expected to be completed in a 4-year period.

Tables 1, 2, 2A, 3, and 3A show quantities, costs, capacities, and design features of the structures.

EXPLANATION OF INSTALLATION COSTS

Public Law 566 funds are expected to provide technical assistance during the 7-year installation period to accelerate the installation of land treatment measures for watershed protection. These funds amount to $104,905, and include $31,611 for the completion of standard soil surveys. In addition, $62,282 will be provided for technical assistance under going programs.

Local landowners and operators will install the land treatment measures at an estimated cost of $785,281, which includes expected assistance from the Agricultural Stabilization and Conservation Service.

It is expected that the standard soil surveys will begin in the first fiscal year and will be completed during the project installation period.

The technical assistance costs are based on the present cost of the going soil and water conservation district program. The cost of installing land treatment measures needed is based on present prices paid by landowners or operators to establish individual measures in the locality. The amount of land treatment measures needed is based on a study of conservation needs inventory data, on field surveys, and interviews with local agricultural workers. This data has been adjusted for expected participation during the installation period.

The channels are multiple-purpose, serving both flood prevention and agricultural water management. All costs are allocated between these two purposes in accordance with standard procedures where the two purposes are inseparable. This results in 50 percent of the cost being allocated to flood prevention and a like amount to agricultural water management.

The total estimated cost of improving the 132 miles of channels is $1,546,820, of which $914,400, or 59 percent, will be borne by Public Law 566; and $632,420, or 41 percent, will be borne by the local sponsors. Of the $914,400 borne by Public Law 566, $636,660 is for construction and the remaining $277,740 is for installation services. Of the $632,420 borne by the local sponsors, $212,220 is for construction; $400,200 is for land, easements, and rights-of-way; and $20,000 is for administration of contracts and project promotion.

The 3 water control structures serve agricultural water management only. The total estimated cost of installing the 3 water control structures is $274,248, of which $169,058, or 62 percent, will be borne by Public Law 566; and the remaining $105,190, or 38 percent, will be borne by the local sponsors. Of the $169,058 borne by Public Law 566, $102,190 is for construction and the remaining $66,868 is for installation services. Of the $105,190 borne by the local sponsors, $102,190 is for construction; $1,500 is for land, easements, and rights-of-way; and $1,500 is for administration of contracts.

Construction costs for stream channel improvement include a 20 percent contingency allowance, and construction costs for water control structures include a 10 percent contingency allowance. All engineer's estimates were

based upon previous construction costs of structures with similar construction conditions and adjusted to special conditions in the watershed.

The following table shows the estimated schedule of obligations for the 7-year installation period for both structural measures and land treatment measures. This schedule may be adjusted from year to year on the basis of any significant changes in the plan found to be mutually desirable in light of appropriations and accomplishments actually made.

Schedule of Obligations

Fiscal Year	Measures	Public Law 566 Funds	Other Funds	Total
		(dollars)	(dollars)	(dollars)
1st	Land Treatment	-	85,000	85,000
	Soil Surveys	8,000	-	8,000
	Technical Assistance	5,000	8,897	13,897
	Structural Measures	91,567	30,523	122,090
	Installation Services	49,230	-	49,230
	Land, Easements, & Rights-of-Way	-	80,340	80,340
	Contract Administration	-	3,071	3,071
2nd	Land Treatment	-	85,000	85,000
	Soil Surveys	8,000	-	8,000
	Technical Assistance	5,000	8,898	13,898
	Structural Measures	262,575	87,525	350,100
	Installation Services	98,460	-	98,460
	Land, Easements, & Rights-of-Way	-	160,680	160,680
	Contract Administration	-	6,140	6,140
3rd	Land Treatment	-	100,000	100,000
	Soil Surveys	6,000	-	6,000
	Technical Assistance	10,000	8,897	18,897
	Structural Measures	384,708	196,362	581,070
	Installation Services	98,460	-	98,460
	Land, Easements, & Rights-of-Way	-	160,680	160,680
	Contract Administration	-	6,140	6,140
4th	Land Treatment	-	120,000	120,000
	Soil Surveys	6,000	-	6,000
	Technical Assistance	13,000	8,898	21,898
	Installation Services	98,458	-	98,458
	Contract Administration	-	6,149	6,149
5th	Land Treatment	-	150,000	150,000
	Soil Surveys	3,611	-	3,611
	Technical Assistance	18,000	8,897	26,897
6th	Land Treatment	-	135,000	135,000
	Technical Assistance	16,000	8,898	24,898
7th	Land Treatment	-	110,281	110,281
	Technical Assistance	6,294	8,897	15,191
	Totals	1,188,363	1,585,173	2,773,536

EFFECTS OF WORKS OF IMPROVEMENT

Benefits from the installation of these measures will depend upon the installation of needed group water disposal facilities, on-farm laterals, and adequate maintenance of existing drainage systems. Establishment of the land treatment measures will reduce the cost of removing sediment from ditches, thereby reducing annual maintenance costs. A total of 130,225 acres will be benefited by installation of the project. The future expected land use of this area without and with project is as follows.

Land Use	Without Project (Acres)	With Project (Acres)
Cropland	77,100	74,200
Grassland	22,900	24,800
Marsh Range	8,800	8,800
Woodland	9,400	9,400
Miscellaneous	12,025	13,025
Total	130,225	130,225

Benefits to this area will be realized through reduction of flood damages due to the more timely removal of excess water, more efficient production, and realization of range benefits on approximately 6,800 acres of marsh that is presently producing no grazing. At present, the range grass production on the 2,000 acres of marsh being used is declining. This decline will be halted by the installation of the water control structures, and future production in this area will be increased.

Range benefits will stem largely from control of freshwater upstream from the water control structures, thereby promoting the growth of desirable vegetation. The water control structures will reduce the intrusion of saltwater due to normal tidal action, but intrusion from abnormally high tides produced by winds or storms will continue.

The growth of most marsh plants is governed by the fluctuation and salinity of the water. In this area, choice waterfowl and grazing plants are mainly fresh or very slightly brackish and are therefore sensitive to the amount of salt in the soil and water. These structures will help maintain a condition favorable to the existing vegetation and increase the amount of freshwater aquatics. Low tide dewatering of these marshes will be slowed down. Fresh drinking water for ducks and geese that feed daily in the saltwater marshes will be provided, and more freshwater will be made available for waterfowl whose main feeding area is in this marsh.

Forage crop yields will be increased by 20 to 30 percent. These benefits will stem mainly from the opportunity to improve the rice rotation acreage through application of fertilizer and use of more grasses.

Yields per acre of harvested crops will increase approximately 6 to 10 percent. However, the total acreage in cropland will decrease, and with

this decreased acreage the production of harvested crops in surplus supply category is expected to decrease slightly.

PROJECT BENEFITS

Direct primary benefits from crop and pasture are estimated to total $160,903 annually. Of this amount, flood prevention benefits are $72,406 from reduction of damages and $8,046 from more intensive land use. Agricultural water management benefits are $80,451 and include $18,045 from reduced production and harvesting costs and $5,081 from increased price received as a result of improved quality.

The average annual benefits accruing to the marsh area are expected to be $22,907. These benefits will accrue from increased production of forage crops due to the reduction of saltwater intrusion.

Secondary benefits stemming from the project in the form of increased net returns were evaluated. Benefits induced by the project in the form of increased production expenditures were also evaluated. Local benefits accruing annually to the project from these sources are expected to be $25,647. Secondary benefits from a national viewpoint were not considered pertinent in the economic evaluation.

The project will provide other benefits that were not included for project justification. Among these are the increased economic activity in the watershed and neighboring towns and the greater sense of economic security by people living in the area.

COMPARISON OF BENEFITS AND COSTS

Average annual primary benefits from structural measures are estimated to be $183,810. The average annual cost of structural measures (amortized installation cost plus operation and maintenance) is estimated to be $121,070, providing a benefit-cost ratio of 1.5 to 1. Total average annual benefits (including secondary benefits) from structural measures are estimated to be $209,457, producing a benefit-cost ratio of 1.7 to 1 (table 6).

PROJECT INSTALLATION

The project is to be carried out over a 7-year period. The structural measures will be completed within the first 4 years, and the land treatment measures will be completed within the 7-year period. The sponsoring local organizations understand their obligations and have agreed to carry out the work to be done during the installation period.

Most of the land treatment measures will be installed as adequate outlets are made available. Installation of these measures and their maintenance will be outlined with each individual landowner. The agreed-to items will be identified in a conservation plan executed between the individual and the soil and water conservation district serving the area. Accelerated technical assistance to the districts will be made available through Federal funds in order to complete this work within the 7-year installation period.

The Iberia-Vermilion, Grand Coteau Ridge, and St. Mary Soil and Water Conservation Districts will provide the leadership necessary for the application of land treatment measures.

The Iberia Parish Police Jury will be responsible for the local share of the cost of installing structural measures, including cost of construction, land, easements, and rights-of-way, and contract administration.

The jury now owns and operates 4 draglines and 3 bulldozers with full support and operating personnel. The equipment is maintained in good order and is adequate to perform necessary channel improvement in the watershed. A portion of the local sponsors' contribution to construction will be provided by actually performing a portion of the channel enlargement and clearing and snagging.

The works of improvement will be contracted by the jury, and work will be done by the contractor with the cost being shared as indicated in the Watershed Work Plan Agreement.

Installation of structural measures may proceed simultaneously. Construction of the channel improvement will progress in an upstream direction. Laterals should be constructed after work on the main channel has proceeded past the junction of the lateral. Care will be exercised to insure the timely modification or reconstruction of bridges, culverts, etc., in order that they will not be a deterrent to proper functioning of the works of improvement. The jury will be responsible for securing all land, easements, and rights-of-way; all road, bridge, utility, and improvement changes; the local share of the installation costs; advertising for bids; and awarding and administering contracts for the construction of all structural measures.

The Iberia Parish Police Jury has the power, through the right of eminent domain, to secure needed land, easements, and rights-of-way. The members of the jury have agreed to exercise these rights in the execution of this plan where necessary. Since the members have agreed to use the power of eminent domain, it will not be necessary for all easements to have been obtained prior to beginning any work; however, easements should be obtained on a segment contained in a particular contract prior to the contractor's beginning work on that segment.

Technical assistance will be provided by the Soil Conservation Service to assist in design, preparation of specifications, supervision of construction, preparation of contract payment estimates, final inspection, execution of certificates of completion, and related tasks for the establishment of planned works.

A project agreement will be entered into between the Soil Conservation Service and the Iberia Parish Police Jury before any contracts are awarded for the installation of works of improvement.

Construction of the planned structural measures will be started as soon as (1) the project is approved, (2) the local people are prepared to discharge their responsibilities, (3) local and Federal funds are available, (4) the

necessary easements and rights-of-way have been obtained, and (5) maintenance agreements have been executed.

FINANCING PROJECT INSTALLATION

The Federal Government will finance its share of the costs of this project as provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) as amended. Financial and other assistance to be furnished by the Service in carrying out the project is contingent on the appropriation of funds for this purpose.

The Iberia Parish Police Jury is a legally constituted organization under the laws of the State of Louisiana. It has full authority to incur bonded indebtedness for construction of works of improvement, to levy taxes to repay the bonded indebtedness, and to operate and maintain improvements.

The present assessed value of the watershed within Iberia Parish is $28,000,000. At present the residents of the area are assessed 4 mills for the construction, operation, and maintenance of improved channels within the parish. This amount is considered adequate to finance the local share of project installation and to provide funds for the operation and maintenance of jury-owned equipment to perform work as indicated under "Project Installation." This would in no way affect the present or proposed maintenance of works of improvement.

The sponsors do not intend to utilize the loan facilities of the Farmers Home Administration.

The parish Agricultural Stabilization and Conservation Committees will cooperate with the governing bodies of the soil and water conservation districts in selecting practices and providing financial assistance on those Agricultural Stabilization and Conservation Service practices that will help accomplish the conservation objectives in the shortest possible time.

PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of non-Federal groups, agencies, and individuals. Individual landowners and operators will have the responsibility of maintaining land treatment measures. The soil and water conservation districts will assume the responsibility of providing technical assistance to landowners in their area of the watershed for the installation and maintenance of needed land treatment measures. The objectives will be to maintain adequate drains, vegetative cover, or other conservation practices on the land so that full benefits from the project can be realized.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the Iberia Parish Police Jury. In addition to the 132 miles of channels to be constructed, the Iberia Parish Police Jury will continue to maintain 75 miles of existing adequate

channels to insure the proper functioning of the works of improvement to be installed.

The estimated annual maintenance cost of works of improvement to be installed is $48,610. These funds will be required for the control of vegetation in the channels and on the banks, the removal of excessive sediment deposits in the channels, and the operation and maintenance of the water control structures.

A continuing maintenance program will be placed into effect which will provide for the regular removal of sediment deposits in all channels. All channels will be cleared of sediment at least at the end of their life expectancy or when it occurs to the extent that the over-all efficiency of the channel is impaired.

Provisions will be made for representatives of the Soil Conservation Service, the Iberia-Vermilion Soil and Water Conservation District, and the Iberia Parish Police Jury to have free access to all portions of works of improvements at any reasonable time for the purpose of inspection, repair, and maintenance. Representatives of the Soil Conservation Service, Iberia-Vermilion Soil and Water Conservation District, and the Iberia Parish Police Jury will make a joint maintenance inspection of all works of improvement at least annually. Items of inspection will include, but will not be limited to, condition of vegetative cover, need for removal of sediment bars and debris accumulations, care of water control structures, and brush control.

A record of all maintenance inspections and of the work to be done will be maintained by the Iberia Parish Police Jury. This record will be available to other parties or agencies cooperating in the project.

The sponsoring local organizations fully understand their obligations for operation and maintenance and will execute a specific operation and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of works of improvement.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST
Lower Bayou Teche Watershed, Louisiana

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) 1/ Public Law 566 Funds	Other Funds	Total
LAND TREATMENT					
Soil Conservation Service					
Cropland	Acre	25,835	-	617,270	617,270
Grassland	Acre	11,650	-	131,561	131,561
Marshland	Acre	9,600	-	36,450	36,450
Technical Assistance			104,905	62,282	167,187
TOTAL LAND TREATMENT			104,905	847,563	952,468
STRUCTURAL MEASURES					
Soil Conservation Service					
Channel Improvement	Mile	132	636,660	212,220	848,880
Water Control Structures	No.	3	102,190	102,190	204,380
Subtotal - Construction			738,850	314,410	1,053,260
Installation Services					
Engineering Services			258,054	-	258,054
Other			86,554	-	86,554
Subtotal - Installation Services			344,608	-	344,608
Other Costs					
Land, Easements, and Rights-of-Way			-	401,700	401,700
Contract Administration			-	21,500	21,500
Subtotal - Other Costs			-	423,200	423,200
TOTAL STRUCTURAL MEASURES			1,083,458	737,610	1,821,068
TOTAL PROJECT			1,188,363	1,585,173	2,773,536

1/ Price Base: 1964.

April 1965

TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT
(At Time of Work Plan Preparation)
Lower Bayou Teche Watershed, Louisiana

Measure	Unit	Number Applied To Date	Total Cost (Dollars) 1/
LAND TREATMENT			
Bedding	Acre	172	1,071
Brush and Weed Control	Acre	9,350	18,700
Conservation Cropping System	Acre	48,900	100,435
Cover and Green Manure	Acre	9,650	144,175
Crop Residue Use	Acre	24,779	39,040
Land Smoothing	Acre	6,651	12,969
Drainage Land Grading	Acre	10	83
Pasture and Hayland Renovation	Acre	4,785	91,916
Pasture Proper Use	Acre	7,635	9,684
Rotation Grazing	Acre	7,635	9,684
Range Deferred Grazing	Acre	4,500	4,500
Range Proper Use	Acre	4,500	4,500
Controlled Burning	Acre	4,500	450
Woodland Proper Grazing	Acre	3,000	3,000
Wildlife Wetland Development	Acre	1,000	8,000
Wildlife Wetland Preservation	Acre	2,000	10,000
Grasses and Legumes in Rotation	Acre	75	750
Irrigation System	Number	8	4,000
Irrigation Water Management	Acre	400	120
STRUCTURAL MEASURES			
Drainage - Mains and Laterals	Foot	11,872,545	712,353
Spoil Bank Spreading	Foot	600,000	56,000
Dikes and Levees	Foot	211,200	63,360
Pump Plants - Water Control	Number	7	35,000
Structures for Water Control	Number	25	2,000
TOTAL	xxx	xxx	1,311,790

1/ Price Base: 1964.

April 1965

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Lower Bayou Teche Watershed, Louisiana

(Dollars) 1/

Structure	Installation Cost - Public Law 566 Funds				Installation Cost - Other Funds				
		Installation Services		Total Public Law 566 Funds		Other			Total Installation Cost
	Construction	Engineering	Other		Construction	Adm. of Contracts	Land, Easements & R/W	Total	
Channel Improvement	636,660	207,980	69,760	914,400	212,220 2/	20,000	400,200	632,420	1,546,820
Water Control Structures	102,190	50,074	16,794	169,058	102,190	1,500	1,500	105,190	274,248
TOTAL	738,850	258,054	86,554	1,083,458	314,410	21,500	401,700	737,610	1,821,068

1/ Price Base: 1964.

2/ Estimated cost of performing 25 percent of actual construction work.

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TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Lower Bayou Teche Watershed, Louisiana

(Dollars) 1/

Item	Purpose: Flood Prevention	Purpose: Agri. Water Management	Total
	COST ALLOCATION		
Single-Purpose Water Control Structures		274,248	274,248
Multiple-Purpose Channel Improvement	773,410	773,410	1,546,820
Total	773,410	1,047,658	1,821,068
	COST SHARING		
Public Law 566	563,310	520,148	1,083,458
Other	210,100	527,510	737,610
Total	773,410	1,047,658	1,821,068

1/ Price Base: 1964.

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TABLE 3 - STRUCTURE DATA - CHANNELS
Lower Bayou Teche Watershed, Louisiana

Channel Designation	Station Numbering From Station	Station Numbering To Station	Drainage Area (acres)	Drainage Curve	Gradient at Outlet (ft./ft.)	Bottom Width at Outlet (feet)	Side Slopes at Outlet	Depth at Outlet (feet)	Velocity at Outlet (f.p.s.)	Required Channel Capacity at Outlet (c.f.s.)	Planned Channel Capacity at Outlet (c.f.s.)	Estimated Volume of Excavation (cu.yds.)	Estimated Volume With Allowance For Overcut (cu. yds.)	Elevation of Hydraulic Gradient Outlet (ft.m.s.l.)
M-1	301+50	478+50	22,570	Coastal & Marsh Range	.00003	60	1½:1	12.9	1.35	1,149	1,153	194,993	213,548	0.5
L-1A	56+00	250+00	14,132	Coastal & Marsh Range	.00001	50	1½:1	11.3	.71	440	446	205,412	218,681 1/	1.1
L-1A	250+00	360+00			Clearing and Snagging									
L-1A	360+00	480+00												
L-1A1	103+00	191+00	3,266	Coastal & Marsh Range	.00003	12	1½:1	9.9	.68	147	149	31,483	33,542 1/	1.1
L-1A1	191+00	235+00			Clearing and Snagging									
L-1A1	235+00	249+00												
L-1B	0+00	222+00	7,299	Coastal & Marsh Range	.00003	30	1½:1	9.9	1.08	345	399	107,320	118,142	1.8
L-1C	0+00	624+50	14,673	Coastal & Urban	.00005	35	1½:1	10.3	1.49	650	650	454,826	474,762	2.0
L-1C2	0+00	25+00	391	Coastal & Urban	.0005	4	1½:1	4.9	1.26	52	52	4,403	4,588	8.4
L-2B	0+00	86+00	4,278	Coastal & Urban	.00035	8	1½:1	8.2	2.01	255	278	22,437	23,711 1/	1.0
L-2B	86+00	194+00			Clearing and Snagging									
L-2B	260+00	376+00												
M-4	0+00	530+20	31,671	Coastal	.00005	40	1½:1	13.7	1.72	1,170	1,168	1,001,759	1,031,762	0.8
L-2D	0+00	95+00	6,063	Coastal & Urban	.00005	30	1½:1	9.1	1.11	361	366	44,130	47,900 1/	1.2
L-2D	95+00	223+00	3,948	Coastal & Urban	Clearing and Snagging									
L-2D	223+00	263+00	1,276	Coastal & Urban	.0007	4	1½:1	6.6	1.82	148	180			
L-4F6	0+00	112+00	1,805	Coastal & Marsh Range	.0008	4	1½:1	5.9	1.97	108	110	9,103	10,293 1/	16.0
L-1A10	0+00	205+00	2,817	Coastal								20,500	22,550 2/	
L-1B3	0+00	30+00	665	Coastal								3,000	3,300 2/	
L-1B4	0+00	140+00	1,950	Coastal	Clearing and Snagging									
L-1C9	0+00	112+00	840	Coastal								23,856	26,242 2/	
L-2A2	0+00	190+00	1,963	Coastal								19,300	21,230 2/	
L-2B1	0+00	166+00	1,500	Coastal								12,450	13,695 2/	
L-2D3	0+00	7+00	740	Coastal								525	577 2/	
L-2D4	0+00	80+00	1,000	Coastal								6,000	6,600 2/	
L-3B1	0+00	120+00	3,265	Coastal								18,000	19,800 2/	
L-3B1A	0+00	125+00	2,065	Coastal								12,500	13,750 2/	
L-3B1A1	0+00	66+00	900	Coastal								5,000	5,500 2/	
L-3B	109+00	169+00	3,610	Coastal	Clearing and Snagging									
L-3G	0+00	88+00	1,229	Coastal								4,400	4,840 2/	
L-3H	0+00	130+00	1,404	Coastal								13,000	14,800 2/	
L-4A	0+00	279+00	3,756	Coastal								21,000	23,100 2/	
L-4B	0+00	66+00	721	Coastal	Clearing and Snagging									
L-4C	0+00	40+00	819	Coastal								10,674	11,741 2/	
L-4D	0+00	76+00	1,926	Coastal	Clearing and Snagging									
L-4E	0+00	61+00	663	Coastal								6,100	6,710 2/	

(continued next page)

4.(continued)
Table 3 - Structure Data - Channels
Lower Bayou Teche Watershed, Louisiana

4-65

Channel Designation	Station Numbering From Station	Station Numbering To Station	Drainage Area (acres)	Drainage Curve	Gradient at Outlet (ft./ft.)	Bottom Width at Outlet (feet)	Side Slopes at Outlet	Depth at Outlet (feet)	Velocity at Outlet (f.p.s.)	Required Channel Capacity at Outlet (c.f.s.)	Planned Channel Capacity at Outlet (c.f.s.)	Estimated Volume of Excavation (cu.yds.)	Estimated Volume With Allowance For Overcut (cu. yds.)	Elevation of Hydraulic Gradient Outlet (ft.m.s.l.)
L-4F	0+00	193+30	5,569	Coastal	Clearing and Snagging									
L-4F2	0+00	57+00	799	Coastal	Clearing and Snagging									
L-2A1	0+00	88+00	1,132	Marsh Range	Clearing and Snagging									
M-5	80+00	160+00	1,982	Coastal	Clearing and Snagging									
M-6	83+00	116+00	1,100	Coastal								2,500	2,750 2/	
M-7	0+00	60+00	3,000	Coastal	Clearing and Snagging									
L-7A	0+00	23+00	1,200	Coastal								1,750	1,925 2/	
M-8	0+00	58+00	2,500	Coastal								2,500	2,750 2/	
L-8A	0+00	47+00	700	Coastal								3,525	3,877 2/	
M-9	0+00	60+00	3,000	Coastal	Clearing and Snagging									
M-10	0+00	40+00	1,500	Coastal	Clearing and Snagging									
M-10	40+00	70+00										5,200	5,720 2/	
M-11	0+00	58+00	1,000	Coastal								5,800	6,380 2/	
M-12	0+00	72+00	800	Coastal								7,200	7,920 2/	

1/ Total excavation for ditch.

2/ Ditch not designed - quantities estimated.

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TABLE 3A - STRUCTURE DATA - WATER CONTROL STRUCTURES

Lower Bayou Teche Watershed, Louisiana

Structure Number	Required Capacity (c.f.s.)	Designed Capacity (c.f.s.)	Elevation Top of Inside Gate (ft.m.s.l.)	Elevation Top of Outside Gate (ft.m.s.l.)	Earth Fill (cu. yds.)	Elevation Top of Earth Fill (ft.m.s.l.)	Number of Gates and Width 1/	Type of Structure
1	344	389	+ 1.0	+ 4.7	40,250	+ 6.7	4 - 7' Bays	Automatic Operating
2	147	150	+ 1.0	+ 4.7	26,980	+ 6.7	2 - 5' Bays	Automatic Operating
3	300	330	+ 1.0	+ 4.7	15,680	+ 6.7	3 - 8' Bays	Automatic Operating

1/ One 12' boat bay, in addition to bays shown below, will be installed in each structure.

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TABLE 4 - ANNUAL COST

Lower Bayou Teche Watershed, Louisiana

(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation and Maintenance Cost 3/	Total
Channel Improvement and Water Control Structures	72,460	48,610	121,070
TOTAL	72,460	48,610	121,070

1/ Price Base: 1964.

2/ Installation costs amortized for 50 years at 3-1/8 percent interest.

3/ Long-term prices as projected by ARS, September 1957.

April 1965

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Lower Bayou Teche Watershed, Louisiana

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Agricultural Crop and Pasture	101,267	28,861	72,406
TOTAL	101,267	28,861	72,406

1/ Long-term price prices as projected by ARS, September 1957.

April 1965

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Lower Bayou Teche Watershed, Louisiana

(Dollars) 1/

Evaluation Unit	Flood Prevention: Damage Reduction	Flood Prevention: More Intensive Land Use	Agricultural Water Management: Increased Efficiency	Agricultural Water Management: Salt Exclusion	Secondary	Total	Average Annual Cost	Benefit-Cost Ratio
Channel Improvement and Water Control Structures	72,406	8,046	80,451 2/	22,907	25,647	209,457	121,070	1.7:1
GRAND TOTAL	72,406	8,046	80,451	22,907	25,647	209,457	121,070	1.7:1

1/ Price Base: Benefits are long-term projected and costs are from table 4.

2/ Includes $18,045 of reduced costs of production and $5,081 for increased price resulting from improved quality.

April 1965

INVESTIGATIONS AND ANALYSES

Land Use and Treatment

Land Use and Treatment Needs

Records of accomplishments, tabulations of conservation needs, and other information from the work unit of the Soil Conservation Service and from other agricultural agencies were used to determine the probable land use and treatment to be expected under going programs. Rice allotments prohibit increases in rice acreages and affect the acreages of other crops. Such items were considered in evaluating land use and treatment needs. The reduced acres of rice and corn are expected to be used for the production of forage crops.

Soil Conditions

The watershed area was sampled, using soil maps and field surveys, to determine soil conditions. Soil maps were available for most of the watershed. Information on soils was analyzed by Soil Conservation Service personnel working with the soil and water conservation districts serving the area. Approximately 35 percent of the watershed is in freshwater marsh and moderately saline marsh. The remaining 65 percent is in mineral soils, of which Jeanerette, Olivier, Iberia, and Baldwin are the predominant soil series. Drainage in all of these soils is generally poor.

Engineering Investigations

The following study was made to determine the structural measures for flood prevention and agricultural water management which would be feasible to install.

1. A base map was prepared showing the watershed boundary, drainage pattern, system of roads, and other pertinent information. A map of the watershed was prepared on which land use, soil types, and other pertinent data were shown. Quadrangle sheets, aerial photographs, parish road maps, and other maps showing physical features were assembled and used to determine the best approach to locating needed measures.

2. A determination concerning the possibility of installing floodwater retarding structures was made. The topography is not suitable for this type of measure because of insufficient relief.

3. The local sponsors determined the channels they felt should be included.

4. Profiles and cross sections of all proposed channels whose drainage area was more than about 4 square miles were surveyed. This varied in some instances between 3 square miles and 5 square miles. The cost of enlarging these ditches serving less than 3 to 5 square miles was estimated in the following way.

a. The engineering technician assigned to the local work unit and the planning engineer walked out all ditches to determine the condition of each.

b. Where clearing and snagging was necessary, the amount and estimated unit cost were noted.

c. Where it was evident that enlargement would be needed, this was estimated and the probable unit cost was determined.

d. The location of approximately 19 miles of small laterals will be made in the design stage when additional data become available. A determination was made that these ditches are needed and feasible; however, additional field data are needed to determine the exact location of them.

5. In the project area it has been determined that drainage curves will be used for design of channels serving both flood prevention and agricultural water management. Flood routing is not feasible due to the broad, flat areas to be protected. Ample experience is available to determine that the agreed-upon level of protection for the project will be obtained by the use of drainage curves. The drainage curves are based on the general formula $Q = CM^{5/6}$, which has been tested for more than 20 years through a complete life cycle of drainage systems. The criteria used will provide about a two-year level of protection against flood damage to crops from rainfall runoff.

6. Unit costs of structural measures were estimated based on the going rate of similar work in the general area. These costs were adjusted to meet special conditions that exist in the watershed.

When the land treatment measures and those structural measures for flood prevention and agricultural water management had been determined, a table was developed which gave the total cost of each type of measure. The summation of the total costs for all the needed measures represented the estimated installation costs of the project (table 1). A second table was developed to show the annual costs of installation and operation and maintenance of the structural measures (table 4). Pertinent physical data for individual structural measures are summarized in tables 3 and 3A.

Sedimentation Investigations

After a reconnaissance of the watershed area and discussion with local Soil Conservation Service technicians, it was decided that sheet erosion is the chief source of sediment in the area and that, due to the slight slope of the land, this is minor. Since only a slight amount of sediment is involved, channels were over designed to allow for this accumulation. This practice has proved satisfactory.

Geologic Investigations

Geologic investigations were performed in accordance with Louisiana Watersheds Memorandum No. 203. No adverse conditions are anticipated in the construction of the channels. Borings were made in the vicinity of water control structures, and the feasibility of their sites was confirmed from the standpoint of foundation strength. Borrow material is available nearby, and unit costs for earth fill reflect the cost of moving this material to the sites.

Hydraulic and Hydrologic Investigations

Aerial photographs and topographic maps were available during preparation of the plan. These aids, together with field inspection of existing drainage systems, were used to determine drainage areas for design purposes.

Tide stage frequencies were determined from gages near the watershed. The heaviest weight was given to the outside (east) gauge at Vermilion Lock on the Intracoastal Waterway. The stage frequency determinations were checked against observations by Soil Conservation Service technical personnel and other persons with intimate knowledge of drainage outlet and tide conditions in the watershed. The flow capacities of channels and water control structures were designed using drainage criteria based on long-term observations by drainage engineers of the influence of channel capacity on crops. The conclusions from the observations are expressed in the formula $Q = CM^{5/6}$, where Q is the required capacity in cubic feet per second, M is the drainage area in square miles, and C is a coefficient based upon land use, topography, soils, economic considerations, etc. Drainage coefficients are selected to provide economical protection for crops to be grown. In this case the channels were designed using $Q = 45M^{5/6}$ for land normally in cultivation, $Q = 10M^{5/6}$ for marsh, and $Q = 120M^{5/6}$ for urban areas. Runoff rates from cropland drained by pumping were assumed to be equivalent to a 3-inch removal in 24 hours. This rate provides about a two-year level of protection.

The present water disposal system functioning at bank-full capacity is adequate to convey the runoff volume from storms of smaller than the twice-a-year event. The level of protection with project will provide protection from the two-year event.

Proportional runoff volumes were computed for the 50, 25, 10, 5, 2, 1, and one-half year events using the 50-year storm volume as 1.0, runoff amounts for 24-hour rainfall from Weather Bureau Technical Paper 40 and antecedent moisture condition II weighted curve number 80. By plotting the ratio of flood volume vs percent chance, it was determined that the project will reduce floodwater damage 71.5 percent.

The water control structures were planned in such manner that a 5-year tide crest of 4.7 feet above m.s.l. would not inundate the outside gate. The elevations of the tops of the abutments are planned at 6.7 feet m.s.l. in order to provide a safety margin against the damaging effects of wave action.

The inside gates were planned to hold the water level at 1.0 feet m.s.l. inside the control area during dry periods in order to prevent excessive drying of marsh grazing lands.

Design gradients for drainage were established using the estimated average water level at the principal outlets of 0.5 feet m.s.l. Maximum tide stages were not used because there is no general relationship between tide and rainfall events.

Fish and Wildlife Investigations

A reconnaissance of the watershed was made by representatives of the Louisiana Wild Life and Fisheries Commission and a biologist of the Soil Conservation Service. This reconnaissance was made for the purpose of determining if water-based recreation could be provided. A study was made of Lake Peigneur, a shallow lake on the western boundary of the watershed, for development of a recreation area for water-based sports, and to determine the effect of the project on the existing wildlife resources. In a report issued by the Louisiana Wild Life and Fisheries Commission after their reconnaissance of the watershed, it was stated that Lake Peigneur was not suitable for development because of the shallow depth of the lake, the high salinity of the water, and poor suitability of the bottom soils in the production of animal organisms.

The report also indicated that sport fishing in the watershed was of minor importance; however, the marshes and waterways forming the lower portion of the watershed are of some importance, as they make up a part of the coastal nursery for marine species found in this area. This area also serves as a wintering area for thousands of migratory waterfowl. It was determined that the water control structures planned for the marsh area would maintain or improve present habitat for waterfowl and furbearers. The Commission also indicated that the structures would have no detrimental effects to the marine species in estuarine areas.

The report has been considered, and no part of planned works of improvement is in conflict with it.

Economic Investigations

Landowners, operators, and agricultural workers were contacted regarding yields, losses, rates of fertilization, and other pertinent data concerning crop production within the watershed. Average yields for different soils were developed from this information and applied to the entire watershed to develop tables necessary to evaluate production losses due to flooding, insufficient drainage, and other agricultural water management problems in the watershed.

Damages in the form of reduced yields, late plantings, increased weed control, and increased harvesting costs are caused from flooding and drainage problems. These problems are due to inadequate outlets for on-farm drainage systems.

Production budgets were developed with the help of local landowners, agricultural workers, and producers to reflect the difference in production costs under present conditions and with-project conditions. These budgets were used to evaluate the actual reduced cost per unit of production and the increased price received per unit resulting from improved quality with project installation.

Damage reduction to crop and pasture was developed from information furnished by the hydrologist. This information indicated that under present conditions bank-full capacity of the water disposal system is adequate to contain the runoff that would be expected to occur from a twice-a-year event. With the project installed, the water disposal system will be adequate to contain the runoff that would be expected to occur from a two-year frequency event. The difference between the twice-a-year event and the two-year event represented 71.5 percent of proportional runoff that would be expected to occur in a 50-year period. This percent was used to reflect the damage reduction by flood prevention.

Protection will induce some farmers to increase production input and allow them to perform operations in a more timely manner. Therefore, based on studies of crop and pasture budgets, it is estimated that more intensive land use benefits represent about 10 percent of the total flood prevention benefits to crop and pasture land.

Tables were developed for the watershed showing average production for crops under future conditions, without the project and with the project. The average annual benefits to the project are estimated to be $209,457.

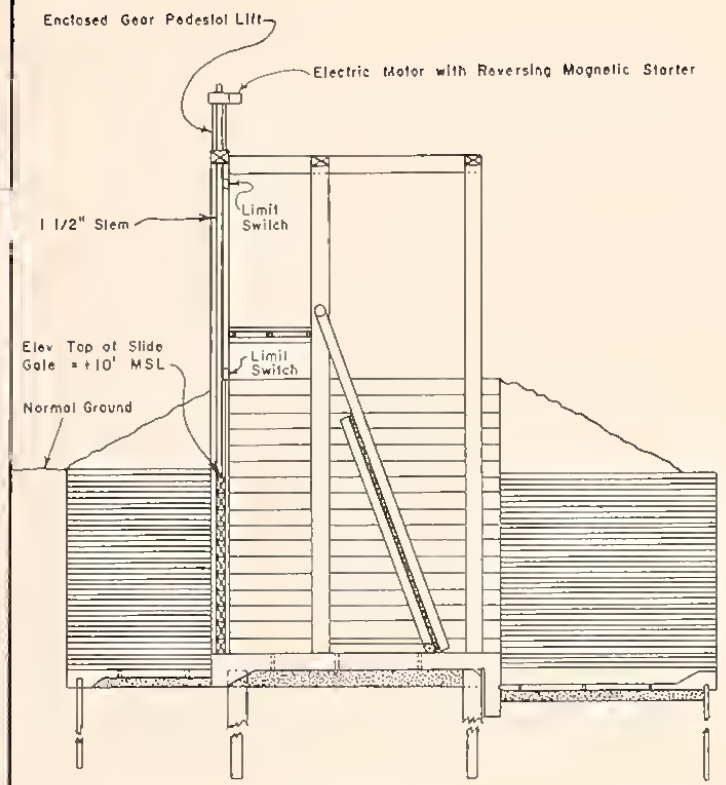
Production budgets for all crops were developed, both for future conditions without and with the project. These included the increased yields due to technology, increased fertilization, and other factors that could possibly increase or affect yields. Prices were obtained locally from agricultural dealers and workers in the area. Projected yields were developed using the information obtained from the local landowners and operators, agricultural workers, and bulletins from Louisiana State University.

The following data have been developed for the watershed.

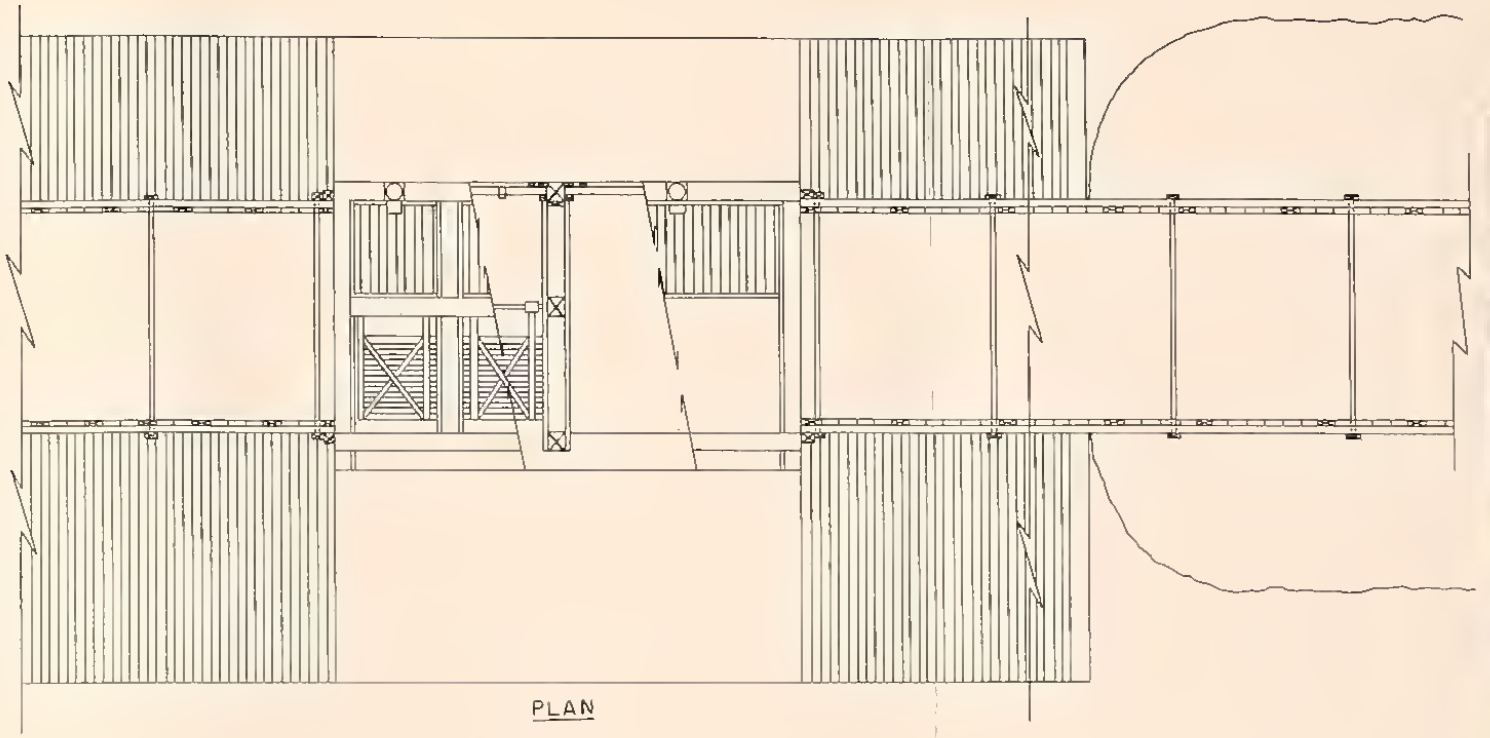
1. Yields and production costs for the various crops grown.
2. Land use and production under future conditions without project.
3. Land use and production under future conditions with project.
4. Associated development costs.
5. Marsh land evaluation.

The benefits claimed for project justification are net benefits. All production costs and associated costs have been deducted. Incomplete participation and the delay of on-farm drainage were also considered in evaluating the benefits. The structural works of improvement were reduced to average annual benefits obtained above. In this manner it was determined that the project was economically justified. The planned structural measures were amortized for a period of 50 years. This amortization period is comparable to that used for similar projects.

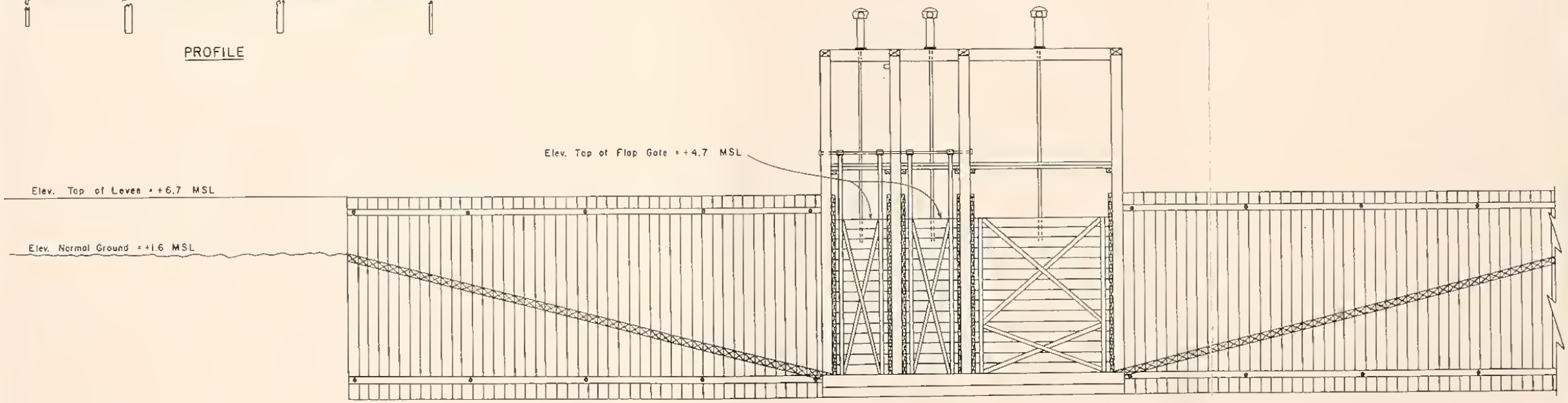
None of the benefits were derived from increased production of crops in surplus supply. The only crops in the watershed that fall into this group are rice, sugar cane, and corn.



PROFILE



PLAN



ELEVATION

Figure 1
TYPICAL PLAN - WATER CONTROL STRUCTURE
LOWER BAYOU TECHE WATERSHED
IBERIA PARISH, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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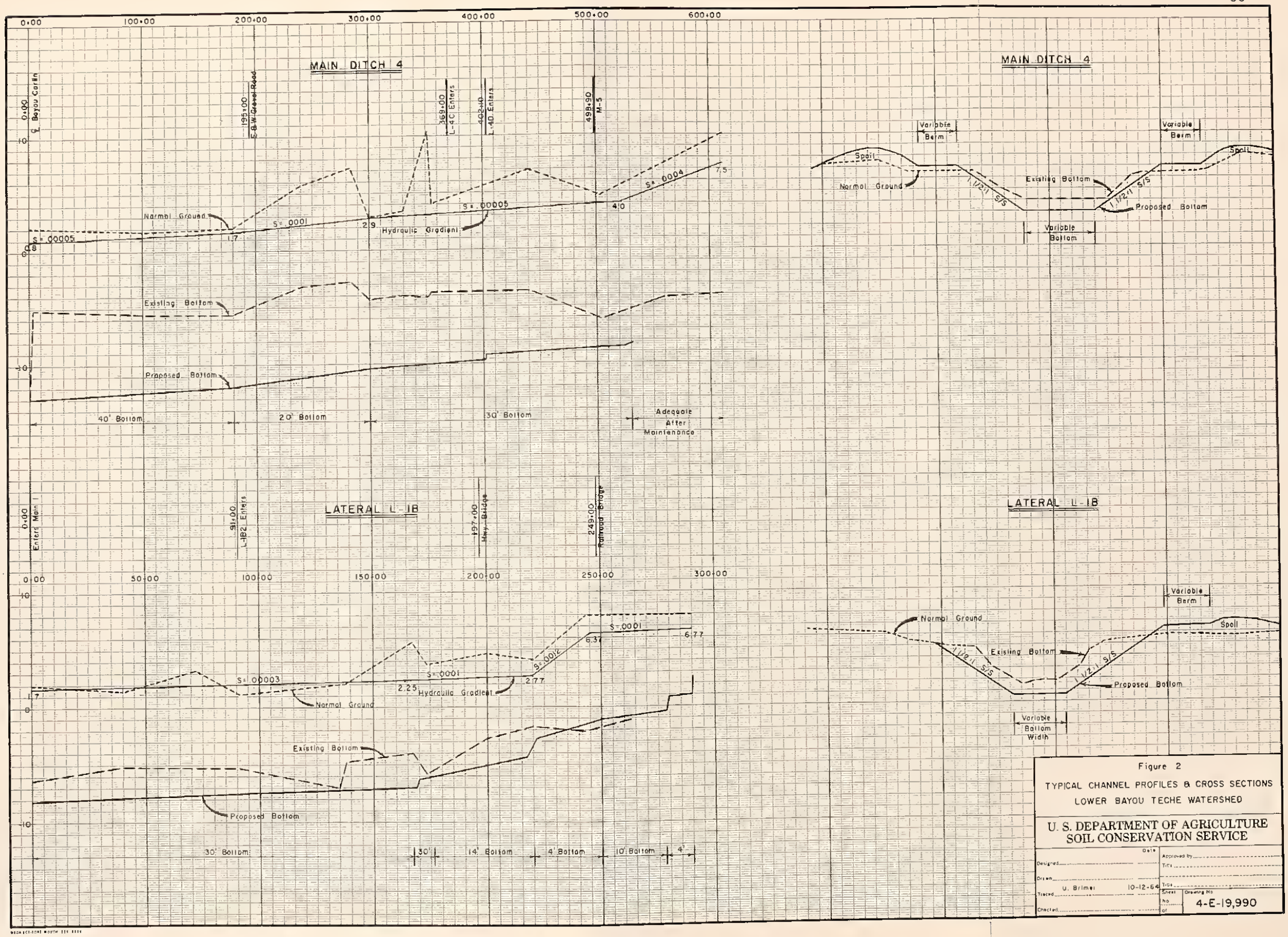

Figure 2

TYPICAL CHANNEL PROFILES & CROSS SECTIONS

LOWER BAYOU TECHE WATERSHED

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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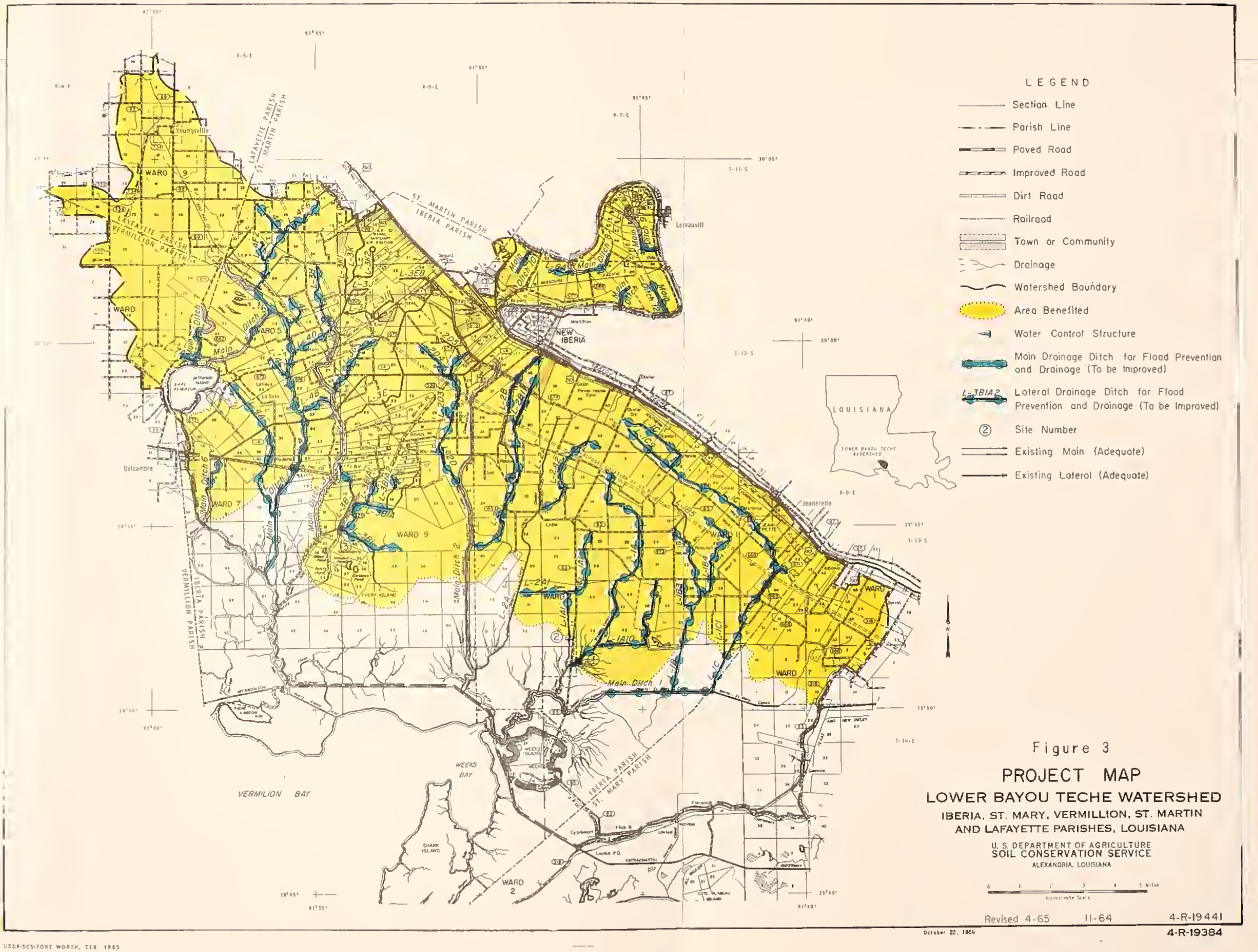

Figure 3

PROJECT MAP

LOWER BAYOU TECHE WATERSHED

IBERIA, ST. MARY, VERMILLION, ST. MARTIN AND LAFAYETTE PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Approximate Scale

Revised 4-65 11-64 4-R-19441

October 22, 1964 4-R-19384

USDA-SCS-FORT WORTH, TEX. 1965